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EXAMINER	
DATSKOVSKIY, SERGEY	
ART UNIT	**PAPER NUMBER**
2121	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/675,883	MCGUFFIN ET AL.	
	Examiner	Art Unit	
	Sergey Datskovskiy	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-23 have been submitted for examination.

2. Claims 1-23 have been rejected.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 1-4, 7-9 and 12-23 are rejected under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter.

4. Independent claims 1, 7, 12, 17 and 18 are directed towards optimizing a characteristic of a system by using a genetic model. There is no indication of said characteristic corresponding to a real-world value or having a physical nature. Therefore, optimizing an abstract characteristic is nothing more then an abstract idea. Abstract ideas (see Warmerdam, 33 F.3d at 1360, 31 USPQ2d at 1759) or mere manipulation of abstract ideas (see Schrader, 22 F.3d at 292-93, 30 USPQ2d at 1457-58) are not patentable. However, for claims including such excluded subject matter to be eligible, the claims must be for a practical application of the abstract idea. Such practical application can be identified in the following ways:

a. The claimed invention "transforms" an article of physical object to a different state or thing.

b. The claimed invention otherwise produces a useful, concrete and tangible result.

Due to the fact that the characteristic is not claimed to be physical, the act of setting the characteristic does not produce any physical transformations. The next step would be to determine whether the claimed invention produces a useful, concrete and tangible result. The claims result in setting the characteristic, which could mean as little as changing the value of a variable in a computer memory. Such result is abstract and, therefore, cannot satisfy the condition of being tangible. Claims 2-4, 8-9, 13-14 and 19-21 are rejected for not being able to fix the problem found in their corresponding independent claims.

5. Claims 12-17 are directed to a system. However the language used in the claims suggests that the system is not a physical apparatus, but rather computer software. Computer programs claimed as computer listings per se, i.e., the descriptions or expressions of the programs, are not physical "things". They are neither computer components nor statutory processes, as they are not "acts" being performed. Such claimed computer programs do not define any structural and functional interrelationship between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized. In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

6. Claims 18-23 are directed to a computer-readable storage medium containing program code. However, there is no indication of the code to be executed by a computer. Without such indication, a code stored on a computer-readable medium represents a non-functional descriptive material, which is not statutory.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The meaning of the phrases "value in the first entry" on line 3 and "value in the second entry" on line 4 is not clear. According to claim 7, each entry comprises a set of values. For the purpose of this examination, Examiner interprets a value in the entry as a value in the set of values associated with the entry.

Claim Objections

8. Claims 2, 8 and 13 are objected to because of the following informalities:

a. The phrase "a plurality of characteristics are associated" in claims 2 and 13 is grammatically incorrect. One way to correct this would be to replace it with "a plurality of characteristics is associated".

b. Claim 8 contains the phrase "a plurality of entries have" that has the same problem as in claim 2 above.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-4, 7-9, 12-14 and 17-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Gabriner et al. (US Patent No. 5,848,403).

Claim 1

Gabriner teaches a method, in a computer-implemented optimization process based on a genetic model, for setting a characteristic of a system to be optimized (Abstract, GA system for optimizing schedules), comprising: associating with the characteristic (characteristics are disclosed as resources and tasks, see col. 5, lines 22-33) a set of values (col. 9, lines 42-49; disclosed as a set of costs associated with tasks and resources) and a first index, the first index corresponding to a gene within a chromosome (col. 6, lines 40-46), the gene comprising a second index corresponding to a particular value in the set of values (col. 6, lines 40-49; each gene is disclosed to have a pair of indices associating resources with tasks); and setting the characteristic in accordance with the particular value (col. 12, lines 5-26; resource/task pairs are

encoded in the genome representing a schedule according to the corresponding cost values).

Claim 2

Gabriner teaches the method of claim 1, wherein a plurality of characteristics are associated with the same first index (Figs 3A and 3B, col. 6, lines 53-61; multiple tasks can be associated with the same resource).

Claim 3

Gabriner teaches the method of claim 1, wherein a first characteristic and a second characteristic are associated with the same first index (Figs 3A and 3B, col. 6, lines 53-61) and, for each applicable value of the second index, the particular value in the set of values associated with the first characteristic and the particular value in the set of values associated with the second characteristic are related by a predetermined ratio (col. 10, lines 11-21; a ratio is disclosed as a relation between cost values being measured by weights).

Claim 4

Gabriner teaches the method of claim 1, wherein associating with the characteristic a set of values and a first index comprises accessing a data structure, the data structure comprising a plurality of entries, each entry corresponding to a characteristic of the system to be optimized, each entry comprising the associated first

index and set of values (col. 6, lines 53-56; disclosed as a genome comprising a plurality of gene data structures).

Claim 7

Gabriner teaches a method, in a computer-implemented optimization process based on a genetic model, for mapping the characteristics of a system to be optimized to the genes of a chromosome (Abstract, GA system for optimizing schedules), the method comprising: generating a lookup table having a plurality of entries (col. 6, lines 53-56; disclosed as a genome comprising a plurality of gene data structures), each entry corresponding to a characteristic of the system to be optimized (characteristics are disclosed as resources and tasks, see col. 5, lines 22-33), each entry comprising a set of values (col. 9, lines 42-49; disclosed as a set of costs associated with tasks and resources) and a first index, the first index corresponding to a gene in the chromosome (col. 6, lines 40-46), the gene comprising a second index corresponding to a particular value in the set of values (col. 6, lines 40-49; each gene is disclosed to have a pair of indices associating resources with tasks).

Claim 8

Gabriner teaches the method of claim 7, wherein a plurality of entries have the same first index (Figs 3A and 3B, col. 6, lines 53-61; multiple tasks can be associated with the same resource).

Claim 9

Gabriner teaches the method of claim 7, wherein the entries corresponding, respectively, to a first characteristic and a second characteristic have the same first index (Figs 3A and 3B, col. 6, lines 53-61; multiple tasks can be associated with the same resource) and, for each applicable value of the second index, the particular value in the first entry and the particular value in the second entry are related by a predetermined ratio (col. 10, lines 11-21; a ratio is disclosed as a relation between cost values being measured by weights).

Claim 12

Gabriner teaches a system programmed to perform the following method: generating, in a computer-implemented process based on a genetic model (Abstract, GA system for optimizing schedules), a chromosome, the chromosome comprising a plurality of genes (col. 6, lines 53-56; disclosed as a genome comprising a plurality of gene data structures); accessing a data structure, the data structure comprising a plurality of entries, each entry corresponding to a characteristic of a device to be optimized (characteristics are disclosed as resources and tasks, see col. 5, lines 22-33), each entry comprising a set of values (col. 9, lines 42-49; disclosed as a set of costs associated with tasks and resources) and a first index, the first index corresponding to a gene within the chromosome (col. 6, lines 40-46), the gene comprising a second index corresponding to a particular value in the set of values (col. 6, lines 40-49; each gene is

disclosed to have a pair of indices associating resources with tasks); and setting at least one characteristic in accordance with the particular value (col. 12, lines 5-26; resource/task pairs are encoded in the genome representing a schedule according to the corresponding cost values).

Claim 13

Gabriner teaches the system of claim 12, wherein a plurality of characteristics are associated with the same first index (Figs 3A and 3B, col. 6, lines 53-61; multiple tasks can be associated with the same resource).

Claim 14

Gabriner teaches the system of claim 12, wherein a first characteristic and a second characteristic are associated with the same first index (Figs 3A and 3B, col. 6, lines 53-61; multiple tasks can be associated with the same resource) and, for each applicable value of the second index, the particular value in the set of values associated with the first characteristic and the particular value in the set of values associated with the second characteristic are related by a predetermined ratio (col. 10, lines 11-21; a ratio is disclosed as a relation between cost values being measured by weights).

Claim 17

Gabriner teaches a system for optimizing a device using a computer-implemented process based on a genetic model (Abstract, GA system for optimizing

schedules), comprising: means for generating a chromosome, the chromosome comprising a plurality of genes (col. 6, lines 53-56; disclosed as a genome comprising a plurality of gene data structures); means for accessing a data structure, the data structure comprising a plurality of entries, each entry corresponding to a characteristic of the device to be optimized (characteristics are disclosed as resources and tasks, see col. 5, lines 22-33), each entry comprising a set of values (col. 9, lines 42-49; disclosed as a set of costs associated with tasks and resources) and a first index, the first index corresponding to a gene within the chromosome (col. 6, lines 40-46), the gene comprising a second index corresponding to a particular value in the set of values (col. 6, lines 40-49; each gene is disclosed to have a pair of indices associating resources with tasks); and means for setting at least one characteristic in accordance with the particular value (col. 12, lines 5-26; resource/task pairs are encoded in the genome representing a schedule according to the corresponding cost values).

Claim 18

Gabriner teaches a computer-readable storage medium (col. 9, lines 25-31) containing program code for setting a characteristic of a system to be optimized according to a process based on a genetic paradigm (Abstract, GA system for optimizing schedules), comprising: a first code segment configured to associate with the characteristic (characteristics are disclosed as resources and tasks, see col. 5, lines 22-33) a set of values (col. 9, lines 42-49; disclosed as a set of costs associated with tasks and resources) and a first index, the first index corresponding to a gene within a

chromosome (col. 6, lines 40-46), the gene comprising a second index corresponding to a particular value in the set of values (col. 6, lines 40-49; each gene is disclosed to have a pair of indices associating resources with tasks); and a second code segment configured to set the characteristic in accordance with the particular value (col. 12, lines 5-26; resource/task pairs are encoded in the genome representing a schedule according to the corresponding cost values).

Claim 19

Gabriner teaches the computer-readable storage medium of claim 18, wherein the first code segment associates a plurality of characteristics with the same first index (Figs 3A and 3B, col. 6, lines 53-61; multiple tasks can be associated with the same resource).

Claim 20

Gabriner teaches the computer-readable storage medium of claim 18, wherein a first characteristic and a second characteristic are associated with the same first index (Figs 3A and 3B, col. 6, lines 53-61; multiple tasks can be associated with the same resource) and, for each applicable value of the second index, the particular value in the set of values associated with the first characteristic and the particular value in the set of values associated with the second characteristic are related by a predetermined ratio (col. 10, lines 11-21; a ratio is disclosed as a relation between cost values being measured by weights).

Claim 21

Gabriner teaches the computer-readable storage medium of claim 18, wherein the first code segment associates with the characteristic a set of values and a first index by accessing a data structure, the data structure comprising a plurality of entries, each entry corresponding to a characteristic of the system to be optimized, each entry comprising the associated first index and set of values (col. 6, lines 53-56; disclosed as a genome comprising a plurality of gene data structures).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 5-6, 10-11, 15-16 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gabriner et al. (US Patent No. 5,848,403) in view of Wang et al. (US Patent No. 6,578,176).

Claim 5

Gabriner teaches the method of claim 1.

Gabriner does not expressly teach that the system to be optimized comprises an integrated circuit.

Wang teaches that the system to be optimized comprises an integrated circuit (Abstract).

Gabriner and Want are analogous art since they are both directed to optimization using a genetic algorithm. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the optimization algorithm and data mapping scheme from Gabriner (col. 6, lines 53-56) and combine it with optimizing an integrated circuit from Wang. The reason for doing so would be to provide a better optimization by allowing an easy detection of duplicate genomes (Gabriner, col. 15, lines 37-40). Therefore, it would have been obvious to modify Gabriner in view of Wang by using a genetic optimization with scheduling mapping to optimize an integrated circuit.

Claim 6

Gabriner teaches the method of claim 5.

Gabriner does not expressly teach that the characteristic comprises one of a cell type, a transistor model, and a transistor width.

Wang teaches that the characteristic comprises one of a cell type, a transistor model, and a transistor width (col. 7, lines 55-59, disclosed library of cells comprises different cell types).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to optimize integrated circuits with a cell type as one of characteristics in the mapping scheme using the same motivation as in claim 5 above.

Claim 10

Gabriner teaches the method of claim 7.

Gabriner does not expressly teach that the system to be optimized comprises an integrated circuit.

Wang teaches that the system to be optimized comprises an integrated circuit (Abstract).

Gabriner and Want are analogous art since they are both directed to optimization using a genetic algorithm. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the optimization algorithm and data mapping scheme from Gabriner (col. 6, lines 53-56) and combine it with optimizing an integrated circuit from Wang. The reason for doing so would be to provide a better optimization by allowing an easy detection of duplicate genomes (Gabriner, col. 15, lines 37-40). Therefore, it would have been obvious to modify Gabriner in view of Wang by using a genetic optimization with scheduling mapping to optimize an integrated circuit.

Claim 11

Gabriner teaches the method of claim 10.

Gabriner does not expressly teach that at least one characteristic comprises one of a cell type, a transistor model, and a transistor width.

Wang teaches that at least one characteristic comprises one of a cell type, a transistor model, and a transistor width.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to optimize integrated circuits with a cell type as one of characteristics in the mapping scheme using the same motivation as in claim 10 above.

Claim 15

Gabriner teaches the system of claim 12.

Gabriner does not expressly teach that the device to be optimized comprises an integrated circuit.

Wang teaches that the device to be optimized comprises an integrated circuit (Abstract).

Gabriner and Want are analogous art since they are both directed to optimization using a genetic algorithm. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the optimization algorithm and data mapping scheme from Gabriner (col. 6, lines 53-56) and combine it with optimizing an integrated circuit from Wang. The reason for doing so would be to provide a better optimization by allowing an easy detection of duplicate genomes (Gabriner, col. 15, lines 37-40). Therefore, it would have been obvious to modify Gabriner in view of Wang by using a genetic optimization with scheduling mapping to optimize an integrated circuit.

Claim 16

Gabriner teaches the system of claim 15.

Gabriner does not expressly teach that the characteristic comprises one of a cell type, a transistor model, and a transistor width.

Wang teaches that the characteristic comprises one of a cell type, a transistor model, and a transistor width (col. 7, lines 55-59, disclosed library of cells comprises different cell types).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to optimize integrated circuits with a cell type as one of characteristics in the mapping scheme using the same motivation as in claim 15 above.

Claim 22

Gabriner teaches the computer-readable storage medium of claim 18.

Gabriner does not expressly teach that the system to be optimized comprises an integrated circuit.

Wang teaches that the system to be optimized comprises an integrated circuit (Abstract).

Gabriner and Want are analogous art since they are both directed to optimization using a genetic algorithm. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the optimization algorithm and data mapping scheme from Gabriner (col. 6, lines 53-56) and combine it with optimizing an integrated

circuit from Wang. The reason for doing so would be to provide a better optimization by allowing an easy detection of duplicate genomes (Gabriner, col. 15, lines 37-40). Therefore, it would have been obvious to modify Gabriner in view of Wang by using a genetic optimization with scheduling mapping to optimize an integrated circuit.

Claim 23

Gabriner teaches the computer-readable storage medium of claim 22.

Gabriner does not expressly teach that the characteristic comprises one of a cell type, a transistor model, and a transistor width.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to optimize integrated circuits with a cell type as one of characteristics in the mapping scheme using the same motivation as in claim 22 above.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Koford et al. (US Patent No. 5,557,533) teaches cell placement alteration apparatus for integrated circuit chip physical design automation system. Koza et al. (US Patent No. 5,867,397) teaches a method and apparatus for automated design of complex structures using genetic programming. Kitano (US Patent No. 5,897,628) teaches a circuit designing method and circuit designing device. Hocaoglu et al. (US Patent No. 6,249,714) teaches a virtual design module. Baldwin (US Patent No. 6,253,365) teaches an automated design system for digital circuits. Kirshenbaum (US

Patent No. 6,378,117) teaches cellular encoding using typed development operators. Stoica et al. (US Patent No. 6,526,556) teaches evolutionary technique for automated synthesis of electronic circuits. Levi et al. (US Patent No. 6,539,532) teaches method and apparatus for relocating elements in an evolvable configuration bitstream. Xiao et al. (US App. No. 2003/0177105) teaches a gene expression programming algorithm. McConaghy (US Patent No. 6,968,517) teaches a method of interactive optimization in circuit design. Afeyan et al. (US Patent No. 7,016,882) teaches method and apparatus for evolutionary design.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sergey Datskovskiy whose telephone number is (571) 272-8188. The examiner can normally be reached on Monday-Friday from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight, can be reached on (571) 272-3687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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